Surveillance for Perinatal Hepatitis B Virus Infection

Perinatal Transmission of Hepatitis B Virus

- Estimated 24,000 infants born to hepatitis B surface antigen (HBsAg) positive women
- Without intervention, approx. 40% of infants become infected with HBV
- 85-90% of infections can be prevented by post-exposure prophylaxis:

  hepatitis B immune globulin (HBIG) and 3-4 doses of hepatitis B vaccine

CDC

Perinatal HBV Surveillance
Objectives

- Monitor trends in the number of perinatal HBV infections
- Identify infected children for follow-up/referral
- Identify and monitor reasons for cases occurring among infants

Why did these infections occur?

- **Missed opportunity?**
  - Delayed HBIG and/or HBV vaccine doses
  - Incomplete vaccination
- **Failure of prophylaxis?**

Elements of surveillance

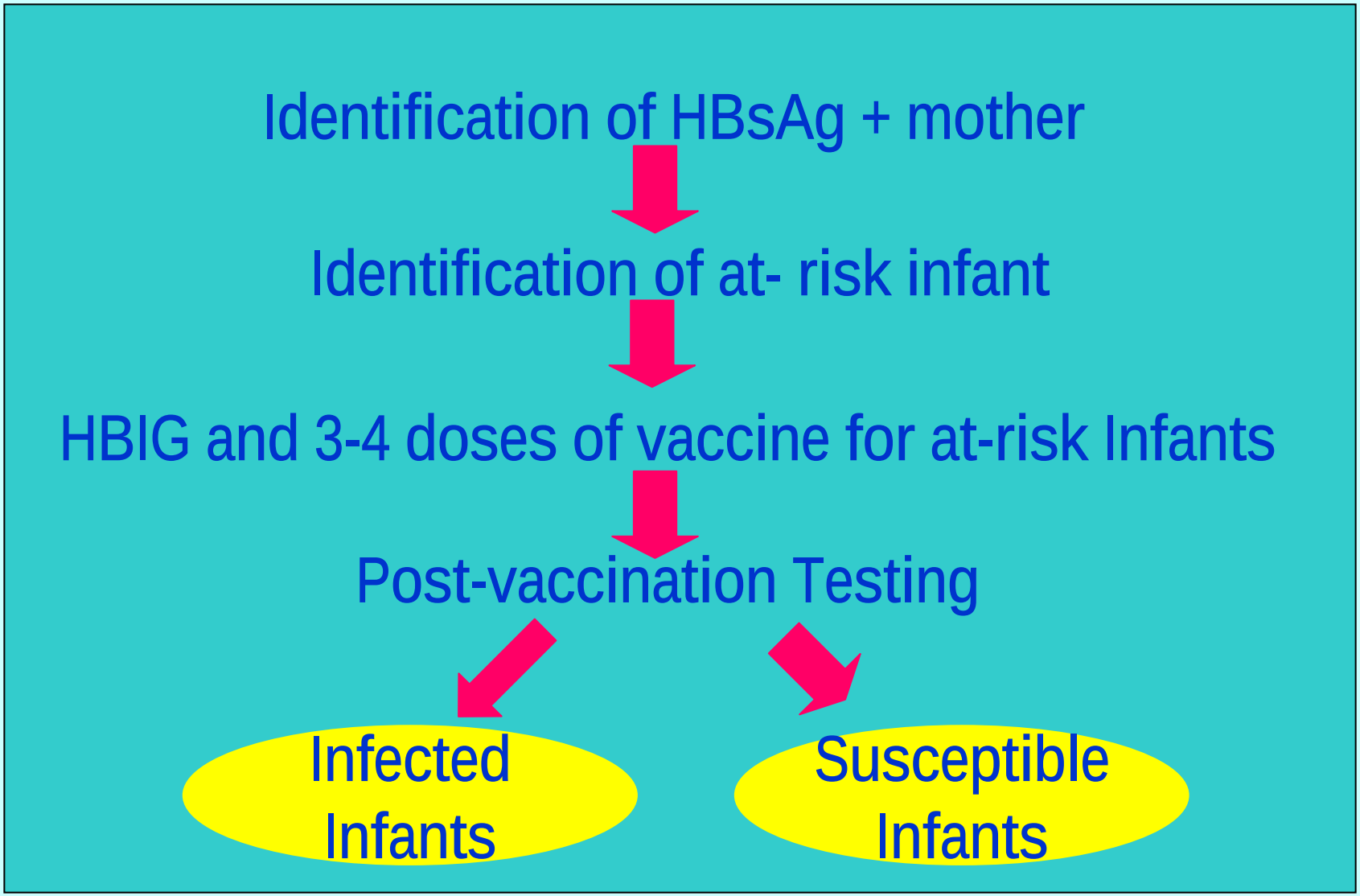
1. Case definition
2. Case ascertainment and identification
3. Case investigation
4. Case reporting
5. Analysis…and action

1. *Surveillance Case Definition*
Perinatal HBV Infection

- ***Nationally notifiable since 1995***
- ***Case classification***
  - HBsAg positivity in any infant <24 months old, who was born in the U.S. or in U.S. territories to HBsAg-positive mother.
- ***Clinical description***
  - Ranges from asymptomatic to fulminant hepatitis.

2. Case Ascertainment

Finding Perinatal HBV Infections



3. Case Investigation

What information do we need about cases of perinatal HBV infection?

- Confirming the case:
  - HBsAg test results for the child and mother
  - Date of diagnosis
  - Age of child
  - Child's country of birth
- Post-exposure prophylaxis history:
  - Date and dosage of HBIG
  - Date and dosage of all hepatitis B vaccine doses
- Other characteristics of child:
  - sex, race
  - additional laboratory results
- Other characteristics of mother:
  - age, race and country of birth
  - Additional laboratory results (e.g. HBV DNA, HBeAg)

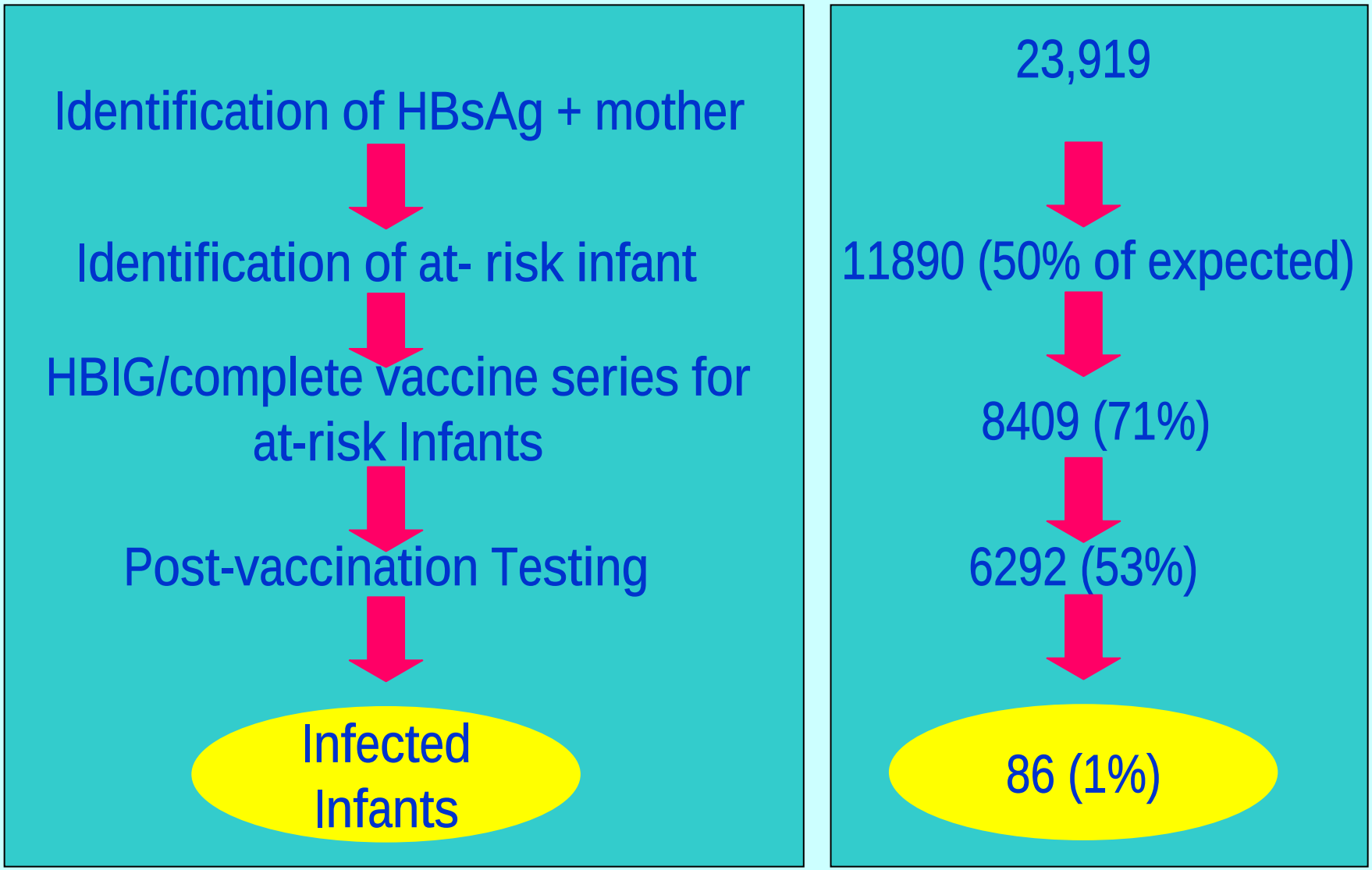
4. Case Reporting

Who needs to know about cases of perinatal HBV infection?

- Annual reporting as part of CDC perinatal HBV prevention program assessment
  - Direct reporting by state coordinators to CDC perinatal HBV prevention program
  - Aggregate counts by state /no additional info
- Weekly reporting to NNDSS (via NETSS)
  - Reporting done via state communicable disease departments
  - Started in 2001
  - Uses event code 10104
  - Line listed data allows reporting of case specific data
    - With NETSS, only limited data elements (e.g. age, race, sex)
    - With NEDSS, reporting of more information(e.g. vaccination history, other laboratory tests) possible.

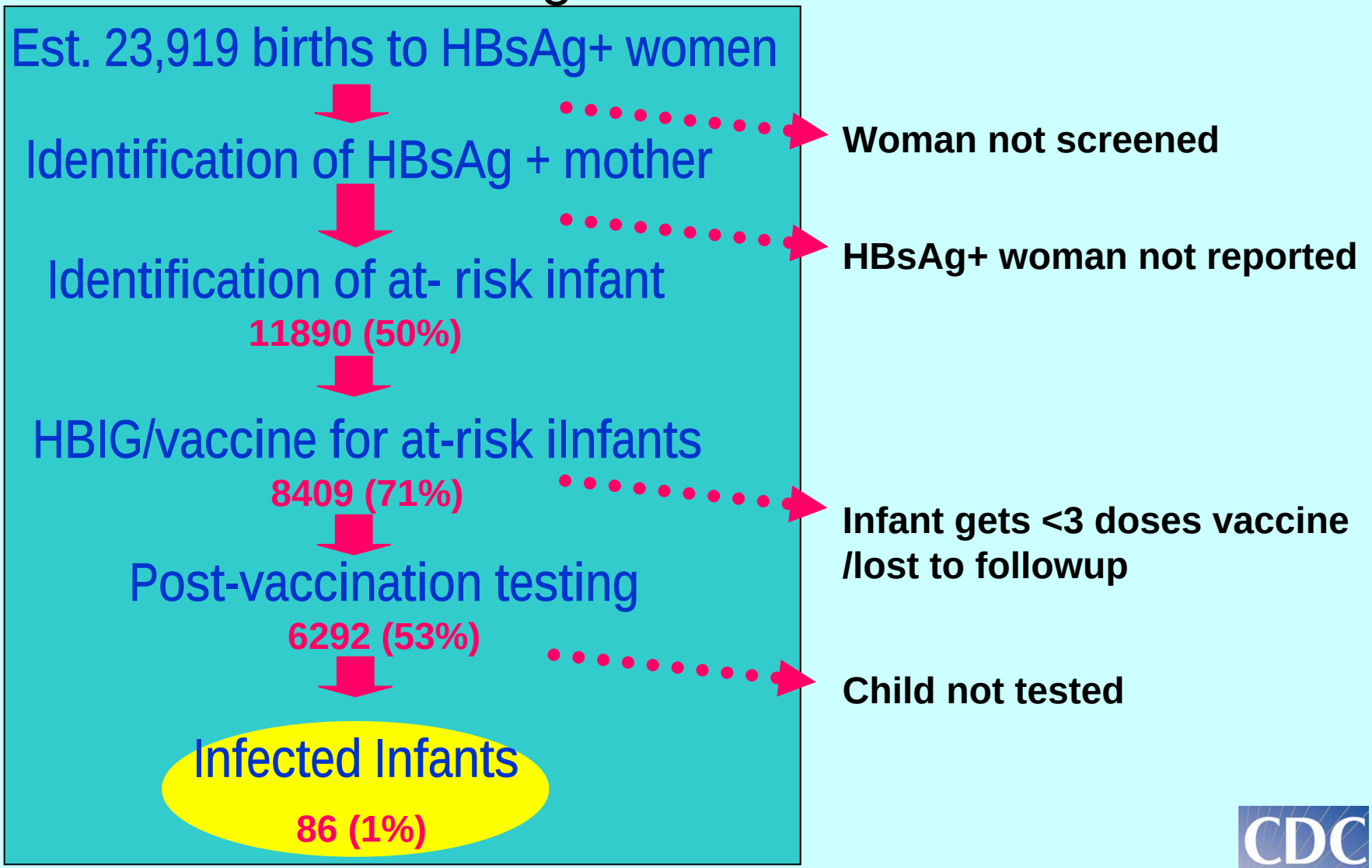
Status of surveillance for perinatal HBV infection:

How're we doing in 2005?

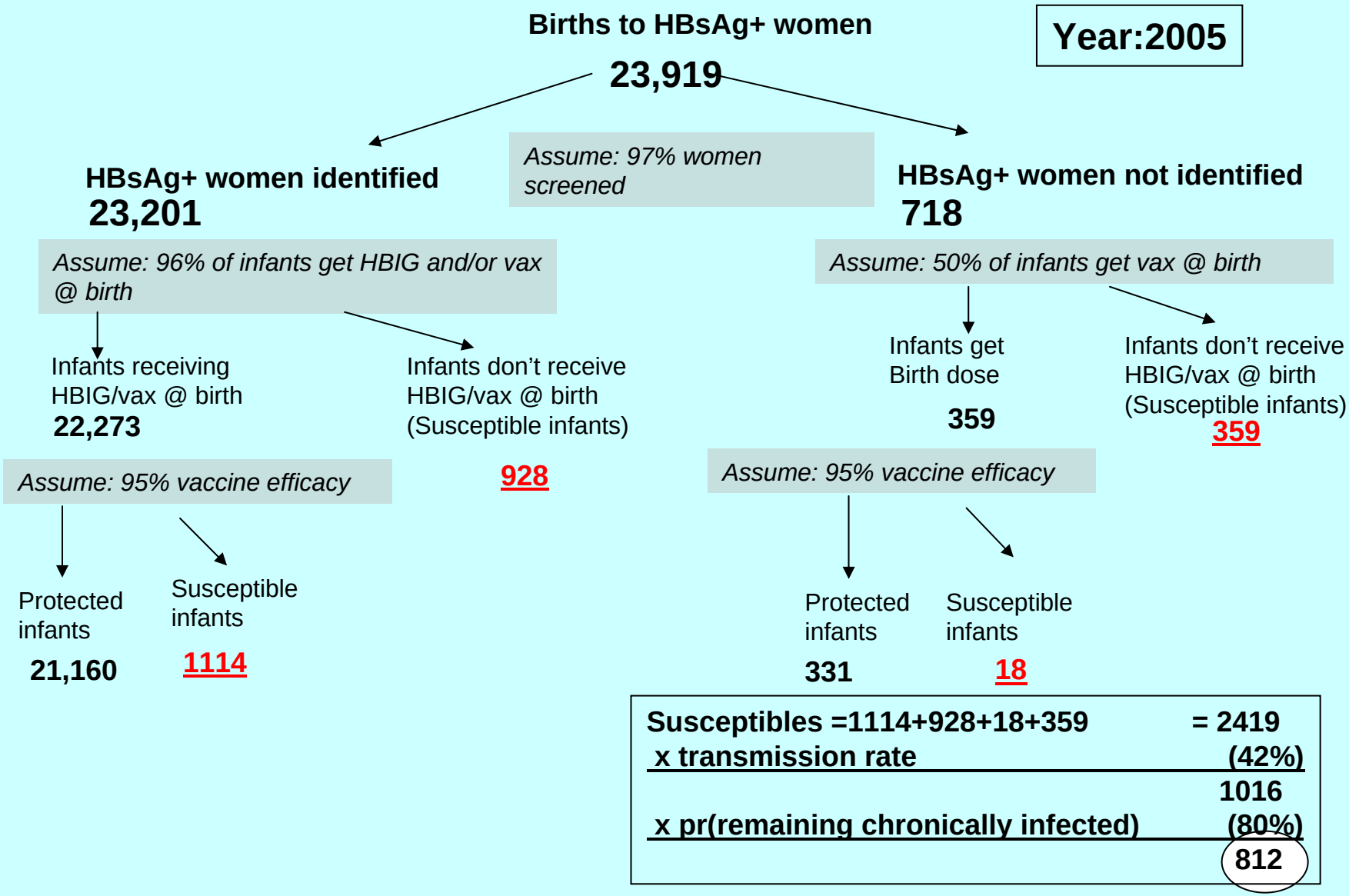


Source: Draft 2005 Annual Assessment of Progress towards goals to prevent perinatal HBV transmission

Status of surveillance for perinatal HBV infection: Missing cases in 2005?



Perinatal HBV infections: How many are there?



An estimate is just an estimate

→Dependent on the assumptions …..

→Many assumptions go into this estimate and these could be expanded or changed….

→Current assumptions are conservative….

<u>Three Important Ones</u>

- Number of births to HBsAg+ women
- All infants of tested HBsAg+ women are equally likely to complete PEP regardless of whether they receive case mgmt
- Women who aren't screened have similar prevalence of HBsAg as screened women.

Post-Exposure Immunization by Receipt of Case Management

State (yrs)	Case management	No.(%)	HBIG and HepB at birth No. (%)	Complete series by 8 mo No. (%)
Alabama	Yes	982 (78)	905 (92)	828 (90)
(1990-2002)	No	318 (22)	212 (67)	189 (59)
Connecticut	Yes	64 (52)	64 (100)	52 (90)
(1994-1995)	No	58 (48)	52 (90)	189 (48)

Sources: Brian Wheeler, Alabama Department of Public Health, 2004
MMWR 1996;45:584-7

CDC

HBsAg Prevalence among Pregnant Women by Prenatal Screening Status, Philadelphia, 1991

Prenatal Screening	No. of Women Tested	HBsAg-positive No. (%)
Yes	1555	12 (0.8)
No	208	14 (6.7)

Source: JAMA 1991;266:2852-5

CDC

Conclusions

- No reliable data to measure incidence of perinatal HBV infection
  - Cases represent <<10% of estimated infections
  - Missed cases occur at all stages
    - from identification of HBsAg+ mother to postvaccination testing of infant
- Estimated incidence used to measure program impact
  - Dependent upon accuracy of assumptions
  - Conservative estimate

***Status of surveillance for perinatal HBV infection*:**

What do we know about the cases we do identify?

- Use NNDSS case data
  - Line listed data (vs. aggregate counts n annual assessment)
  - Limited data (age,race,sex) available but since 2001, have followed up with reporting states to get additional information(e.g. vaccine history)
- All cases reported in annual assessment should be in NNDSS and vice versa

Cases of perinatal HBV infection reported through NNDSS, 2002-2006

	TOTAL*	
# cases reported	759 (131-215/yr)	
	x	%
# that were ”true” cases	191	25
# that were not confirmed cases	568	75
>data entry errors	346	46
>hepatitis B but not U.S. perinatal	140	18
>insufficient info to assess/lost to followup	82	11

Excluding 37 pending cases in 2006

CDC

Reported cases: Annual assessment vs. NNDSS

	Annual Assessment			NNDSS (verified cases)	
	# reports	#states+cities		# reports	# states
2001	102	24+ 2		18	4
2002	97	21+ 3		41	13
2003	77	23+ 2		54	10
2004	84	24+ 2		37	13
2005	87	25+ 3		28	10
TOTAL	447 (89/yr)			178	

Characteristics of cases of perinatal HBV infection reported through NNDSS, 2002-2006

		TOTAL	
Number of true cases		191	
		X	%
Male gender		108	57
Age at diagnosis		13.2 months	
Race	Asian Pacific Islander	110	58
	Black	14	7
	White	13	7
	Other/unknown	54	28

Immunization history of cases of perinatal HBV infection reported through NNDSS, 2002-2006

	TOTAL	
Number of true cases	191	
	X	%
No history of vaccination	19	10
Got HBIG within 1 day of birth	141	74
Got first vaccine dose (with or without HBIG) within 1 day of birth	159	83
and got dose 2 within 30-60 days of birth	100	52
and got dose 3 within 180-210 days of birth	56	29

Conclusions

Characteristics of cases that have been reported indicate:

- Most are Asian/Pacific Islander
- More are male
- Majority of cases have no history of vaccination or vaccination was delayed/incomplete
  - →Suggests missed prevention opportunities, not failure of prophylaxis

Not all cases that are reported through annual assessment are reporting line listed case data through NNDSS

- At least 16 states not reporting through NETSS

Recommendations to improve surveillance for perinatal HBV

- Screening of all pregnant women for HBsAg
  - Local regulations to require prenatal HBsAg screening
  - Work with obstetrical community to increase screening
- Reporting of all HBsAg+ women to health department and identification of their infants to perinatal HBV prevention program
  - Make HBsAg+ results in pregnant women a reportable condition
  - Work with labs, clinicians and others in birthing hospitals to improve reporting of HBsAg+ women
  - Document maternal HBsAg status on birth certificate and/or newborn screening card
- Maximize the number of infants who complete vaccination and receive post-vaccination testing
  - Case management protocols to ensure follow-up
  - Work with pediatric community to emphasize need for appropriate immunoprophylaxis and post-vaccination testing

CDC

Recommendations to improve surveillance for perinatal HBV infection

- Ensure that all cases are completely investigated and reported
  - Establishment of database of HBsAg and antiHBs test results for infants born to HBsAg+ women
  - Standardized collection of complete information on infected infants
  - Strengthen communication between perinatal HBV coordinator and others in health department (e.g in communicable disease) who receive (or should receive) reports of HBV infection.
  - Verify that cases reported through the perinatal HBV prevention progam has also been reported to CDC via NNDSS (and vice versa)

Thanks!

Questions?

Annemarie Wasley acw5@cdc.gov

Scott Grytdal swg0@cdc.gov